

What is claimed is:

1. A modification kit for retrofitting a wing spar on a Lake model amphibious airplane, said airplane having a root rib, and said wing spar comprising a wing-spar cap angle that is attached to a wing spar web, said wing spar web having an upper edge and a lower edge and an inboard end that attaches to said root rib, a first series of wing-attach bolt-holes that is provided in said upper edge and a second series of wing-attach bolt-holes that is provided in said lower edge of said wing spar web, wherein said root rib is angled relative to a vertical plane of said Lake model amphibious airplane, and wherein said inboard end of said wing spar has an inboard-end angle that corresponds to an angle of said root rib, said modification kit comprising:

an upper doubler-strap and an upper filler-strap;
a lower doubler-strap and a lower filler-strap; and
a plurality of wing-spar attachment-bolts;

wherein each said upper filler-strap and each said upper doubler-strap have a third series of wing-attach bolt-holes that corresponds precisely with a first series of wing-attach bolt-holes in an upper edge of a wing spar web, and said lower filler-strap and said lower doubler-strap have a fourth series of wing-attach bolt-holes that corresponds precisely with a second series of wing-attach bolt-holes in a lower edge of said wing spar;

wherein said upper and said lower doubler-straps have a doubler-protective-coating and said upper and said lower filler-straps have a filler-protective-coating, and

wherein said upper doubler-strap has an upper inboard-end angle and said lower doubler-strap has a lower inboard end angle.

2. The kit of Claim 1, wherein said upper and said lower doubler-straps are made of 4340 steel.

3. The kit of Claim 2, wherein said upper and said lower doubler-straps are heat-treated to 180,000 psi.

1 4. The kit of Claim 1, wherein said upper and said lower filler-straps are made of 2024-
2 T3 aluminum.

1 5. The kit of Claim 1, wherein said upper inboard-end angle on said upper doubler-strap
2 is approximately 5°.

1 6. The kit of Claim 1, wherein said lower inboard-end angle on said lower doubler-strap
2 is approximately 6°.

1 7. The kit of Claim 1, wherein said doubler-protective coating is a SermeTel® protective
2 coating.

1 8. The kit of Claim 1, wherein said filler-protective-coating includes a first coating that is
2 an alodine conversion coating and a second coating that is an epoxy primer.

1 9. The kit of Claim 1, wherein each bolt-hole of said third and fourth series of said wing-
2 attach bolt-holes in said upper doubler-strap, said lower doubler-strap, said upper filler-strap,
3 and said lower filler-strap is free of said doubler- protective-coating and of said filler-
protective-coating.

1 10. The kit of Claim 1, wherein said first and said second series of wing-attach bolt-holes
2 in said wing spar web is a series of five wing-attach bolt-holes and wherein said wing-spar cap
3 angle has a flange with at least an upper wing-attach bolt-hole and a lower wing-attach bolt-
4 hole, and wherein each of said third and fourth series of wing-attach bolt-holes in said upper
5 doubler-strap and said lower doubler-strap, respectively, includes a series of five bolt-holes
6 that align with said five wing-attach bolt-holes in said wing spar web and a cap-angle flange
7 bolt-hole at said strap inboard end that aligns with said upper wing attach bolt-hole in said cap
8 angle, and wherein each of said third and fourth series of bolt-holes in said upper filler-strap
9 and said lower filler-strap, respectively, is a series of five bolt-holes that align respectively with
10 said five wing-attach bolt-holes in said upper edge and said lower edge of said wing spar web.

1 11. The kit of Claim 8, wherein said wing spar web has a first series of rivet holes on said
2 upper edge and a second series of rivet holes on said lower edge, and said upper doubler-strap
3 and said upper filler-strap each have a series of rivet holes that corresponds to said first series
4 of rivet holes and said lower doubler-strap and said lower filler-strap each have a series of
5 rivet holes that corresponds to said second series of rivet holes.

1 12. The kit of Claim 9, wherein said upper doubler-strap and said upper filler-strap each
2 have a series of five rivet holes and said lower doubler-strap and said lower filler-strap each
3 have a series of seven rivet holes.

1 13. The kit of Claim 1, further comprising a plurality of wing-attach bolts, a plurality of
2 cap angle bolts, a corresponding plurality of nuts and washers for said wing-attach bolts and
3 said cap angle bolts, and a plurality of rivets.

1 14. The kit of Claim 13, wherein said plurality of wing-attach bolts includes ten NAS 464
2 6A24 bolts, said plurality of cap-angle bolts includes two NAS 464-7A24 bolts, said plurality
3 of nuts and washers includes two AN 364-720 nuts, ten AN 364-624 nuts, four AN 960-716
4 washers and twenty AN960-616 washers, and said plurality of rivets includes twelve AN-470-
5 AD6-22 rivets.

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